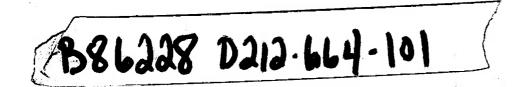
Work Order I July-13-12 12:36:53				*873	326*						Page	1
Revision ID:	2-664-101F			Accept	*N900	040	100)* s	etup Star	IV.	S1*	
	sstube Fwd		J. 4 J.						•	"171;	S2*	
Start Date: 7/20			*1*		Cust Item I	D:						
Required Date: 7/27 Reference:	7/12 Req'd Q	ty: 1.00	*1*		Customer:			i				
	ocess Plan: ML		e:12/07/1			nte:		, R	un Star Stop		R1*	
QC	C:	Dat	e: //	SPC (Y/N):	Da	ıte:			•	*N	R2*	
Sequence ID/ Work Center ID	Operatio Descripti			Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp	
Draw Nbr	Revision Nbr				Λ				· · · · · · · · · · · · · · · · · · ·			
D212-664-141	Rev D (DEO)		\									
*1 \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	DOCUMEN	NT CONTROL Memo Photocopy bluefile a	and create abels as	0.00 0.00 0.00 per PPP D212-664-101	1/03/10 EHG005			·		. ———		-
*110 *11 0 *	Pick Kit Packaging			0.00	el Wo	128						
Packaging		Memo		0.00	U				-			-
Packaging												`
120				0.00							(*)	
120	BENDING	MACHINE - CROSS	STUBES	\sim								
CNC Bend 2		Memo		0.00					1			-
CNC Alpha 160 Bender		Bend tube as per Dy		using CNC bender progr	am 212-fw and							



												DQA:	Date	:	
NCR: Ye	es / f	10				WORK ORDER NON-O	CONF	ORI	MANCE / UP	DATE					
		• • •									QA	Closed:	Date	:	
Work Order	•					DISPOSITION				AGAINST D	EPAR	TMENT/	PROCESS		
Work Order						Rework	7 		Skid-tube	Crosstube			Water Jet	٦	Engineering
Part No) .					Scrap	1		Machining	Small Fab	1	Proc	d. Eng. Coor.	1	Quality
						Use-as-is] -	Thern	noforming	Finishing]	Rec/Stor	e/Packaging		Other
NCR No	o					Work Order Update			Large Fab	Composite			Supplier		
	-					<u> </u>					1 6			_	
Root				٥.		ption of work order update		tial		tion	1	ign &			06 1
Cause	Da	te	Step	Qty		or Non-conformance	Chie	f Eng	Desc	ription	-	Date	Verification	+	QC Inspector
Doc/Data	4	İ									1				
Equip/Tooling	_		*											1	
Operator	4														
Material	-													1	
Setup	4														
Other	4														
Process	-						1								
Supplier	-														
Training	_					<u>.</u>									
Unapproved								CATE	CORY						
							AULT	CATE	GURT						
Landing	_				_	General		_		_			Г	_	4-
	Bend	-			_	Bend		rain		-		alized		_	ressure/Forced
1 -			Concer	ntric to	o/s _	BOM/Route	\mathbf{H}	ardwa		_		-	tolerance	_	emperature/Cure
	Crack	(S			1	Broken/Damaged] [in	spect	ion Incomplete		Par	t Incorrec	et	V	Veld

Instructions Incomplete/Unclear

Maintenance

Out of Calibration

Out of Sequence

Outside Dimensions

Mislabeled

Misread

Offset

Wrong Stock Pulled

Other

Part Lost/Missing

Positioned Wrong

Power Loss/Surge

Part Moved

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Ripples in Bend

Turning Sequence

Wave/Twist in Tube

Crushed/Crimped.

Inspection Strip in Tube

Torque Waves in Extrusion

Cuffs

Heat Treat

Burrs

Contamination

Countersink

Cut Too Short

Drill Holes

Drawing

Finish

Work Orde July-13-12 12:3		7326		*873	326*							Page 2
Item ID: Revision ID:	D212-664-1	101F		Accept	*N900	040	100)*	Setup	Start	*N:	S1*
Item Name:	Crosstube Fv	vd								Stop	*N!	S2*
Start Date:	7/20/12	Start Qty: 1.00	*1*		Cust Item I	D:						
Required Date: Reference:	7/27/12	Req'd Qty: 1.00	*1*		Customer:							
Approvals:	Process Pl	an:	Date: ,	Tooling:	Da	ite:	-		Run	Start	*N	R1*
	QC:		Date:	SPC (Y/N):	Da	ite:				Stop	*N	R2*
Sequence ID/ Work Center II	D	Operation Description		Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Rej Qty		Reject Number	Insp. Stamp
130		QC15- Crosstube Dimer	nsional Check	0.00								
130 QC Quality Control		Memo		0.00				·				
140				0.00								÷
140		Crosstubes										
Crosstubes		Memo		0.00				/	-			
Crosstubes				g D212-664-141 using drill et-up towers in hole #7 as pe								
	•	DT8548 &		s per Dwg D212-664-14 us ons between holes, both sides.								

3-Scribe part # and batch # using vibrating stylus as per Dwg D2 12-664-141

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

NCR:	/es	/ No				WORK ORDER NON-C		NFORM	MANCE / UPI	DATE		_	
,						7			· · · · · · · · · · · · · · · · · · ·		QA Closed:	Date	•
Work Orde	er:					DISPOSITION				AGAINST DE	PARTMENT	PROCESS	
	•					Rework	1		Skid-tube	Crosstube		Water Jet	Engineering
Part N	No.					Scrap	1 1	1	Machining	Small Fab	Pro	d. Eng. Coor.	Quality
						Use-as-is		Thern	noforming	Finishing	Rec/Stor	e/Packaging	Other
NCR I	١٥.					Work Order Update]		Large Fab	Composite		Supplier	
				,			\square						
Root						ption of work order update		nitial	Act		Sign &		
Cause		Date	Step	Qty		or Non-conformance	Ch	ief Eng	Descr	iption	Date	Verification	QC Inspector
Doc/Data													
Equip/Tooling	_												
Operator	Щ												
Material	_												
Setup													
Other													
Process													
Supplier													
Training													
Unapproved				l	<u> </u>		<u> </u>		<u> </u>				
							AUL	T CATE	GORY				
Landi	$\overline{}$	1				General	_	1			1	_	- .
	$\overline{}$	Bending				Bend	\vdash	Grain			Ovalized	-	Pressure/Forced
		Centre No	t Concei	ntric to	o/s	BOM/Route	<u> </u>	Hardwa			Over/Under	<u> </u>	Temperature/Cure
		Cracks			_	Broken/Damaged		1 `	ion Incomplete		Part Incorre		Weld
	_	Crushed/Crimped_				Burrs		1	tions Incomplete/l	Jnclear	Part Lost/Mi	ssing	Wrong Stock Pulled
	\vdash	Cuffs				Contamination		Mainte			Part Moved		
	\vdash	Heat Trea				Countersink	_	Mislabe		<u> </u>	Positioned V		-
	-	Inspection		Tube		Cut Too Short		Misread	d		Power Loss/	Surge	Other
		Ripples in			_	Drill Holes		Offset					
	_	Torque W			n	Drawing		1	Calibration				
		Turning Se	equence			Finish		Out of 9	Sequence				

Outside Dimensions

DQA:

Date:

Wave/Twist in Tube

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Work Ord July-13-12 12:		7326		*873	326*						Page 3
Item ID: Revision ID:	D212-664-	101F		Accept	*N900	040	100)*	Setup Star	1.7	S1*
Item Name:	Crosstube F	wd							Sto	• *N	S2*
Start Date: Required Date:	7/20/12 : 7/27/12	Start Qty: 1.00 Req'd Qty: 1.00	*1* *1*		Cust Item I Customer:	D:					
Reference: Approvals:	Process P	lan:	Date:	Tooling:	Da	ate:	=		Run Stai	rt *N	R1*
rpprovais.			Date:			ate:			Sto	*N	R2*
Sequence ID/ Work Center I	D	Operation Description QC5- Inspect part compl	leteness to step on W/O	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160 QC Quality Control		Мето		0.00							
170		Outsource process - ND	Г per QSI038 4.1	0.00							
Outsource process	- NDT	Issue P/O:_ LPI as per A	estrant Inspection as per QS								

0.00

0.00

180

180 Packaging

Packaging

Receive & Inspect for Damage & Mat'l Certs

Ensure copy of NDT results attached to work order.

Memo

Packaging

											DQA:	Date:	
NCR:	Yes	/ No				WORK ORDER NON-C		VFORI	MANCE / UPI	DATE			
····						•					QA Closed:	Date:	
Work Ord	or.					DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
WOIR OIG	CI.					Rework	1		Skid-tube	Crosstube	1	Water Jet	Engineering
Part	No.					Scrap	1 1	1	Machining	Small Fab	Pro	d. Eng. Coor.	Quality
,						Use-as-is	1		noforming	Finishing	4	re/Packaging	Other
NCR I	No.					Work Order Update			Large Fab	Composite	1	Supplier	
							_						
Root					Descr	iption of work order update	1	nitial	Act	tion	Sign &	1	
Cause		Date	Step	Qty		or Non-conformance	Ch	ief Eng	Desci	ription	Date	Verification	QC Inspector
Doc/Data													
Equip/Tooling													
Operator										•			
Material													
Setup													
Other													
Process													
Supplier													
Training													
Unapproved													
						F	AUL	T CATE	GORY				
Landi	ing (Sear			_	General							-
		Bending				Bend	L	Grain			Ovalized		Pressure/Forced
		Centre N	ot Concer	ntric to	o/s	BOM/Route		Hardwa	re		Over/Under	tolerance	Temperature/Cure
		Cracks				Broken/Damaged		Inspect	ion Incomplete		Part Incorre	ct	Weld
1		Crushed/	Crimped.			Burrs	Γ	Instruct	ions Incomplete/	Unclear	Part Lost/M	issing	Wrong Stock Pulled

Maintenance

Out of Calibration

Out of Sequence

Outside Dimensions

Mislabeled

Misread

Offset

Contamination

Countersink

Cut Too Short

Drill Holes

Drawing

Finish

Folio

Part Moved

Positioned Wrong

Power Loss/Surge

Other

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Cuffs

Heat Treat

Inspection Strip in Tube

Torque Waves in Extrusion

Work Ord <i>July-13-12 12:3</i>		326		*873	26*							Page 4	4
Item ID: Revision ID: Item Name:	D212-664-10			Accept	*N900	040	100)* s	Setup S	Start Stop		S1* S2*	
Start Date:	7/20/12	Start Qty: 1.00	*1*		Cust Item I	D:							
Required Date:	7/27/12	Req'd Qty: 1.00	*1*		Customer:								
Reference:							<u> </u>			140.4			
Approvals:	Process Pla	n:	Date:	Tooling:	Da	ıte:		ħ			*NI	R1*	
	QC:	4	Date:	SPC (Y/N):	· Da	ıte:				Stop	*NI	R2*	
Sequence ID/ Work Center II	D	Operation Description	\	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Rejec Qty		eject umber	Insp. Stamp	
190		QC5- Inspect part compl	eteness to step on W/O	0.00									
190 QC		Memo	\	0.00						<u> </u>			
Quality Control		Inspect for o	lamage & ensure result	s are as per Dwg D212-664-1	41								
193		Crosstubes Chemical Co	nversion	0.00									
102 HandFXtube		Memo		0.00					-				-
Hand Finishing Cro	sstubes	Mento											
195		QC7-Inspect Chemical (Conversion Coat	0.00	h	/							
195				`									
QC		Memo		0.00									-

Memo

Quality Control

											DQA:	Date:	
NCR:	Yes	/ No				WORK ORDER NON-C	CON	NFOR	MANCE / UPDATE				
									•		QA Closed:	Date:	
						DISPOSITION			AGAINS	T DE	PARTMENT/	PROCESS	
Work Ord	er:						ı		си. и ГП — с		1	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\]
D	NI -					Rework			Skid-tube Crosstube	-	Dwa	Water Jet	Engineering Quality
Part	NO.					Scrap Use-as-is			Machining Small Fal noforming Finishin			d. Eng. Coor. e/Packaging	Other
NCR	Nο					Work Order Update	1	men	Large Fab Composite		Nec/3tor	Supplier	- Other
IVER	110.					Work Order opdate	.		composite	<u></u>		Supplie!	· —
Root					Descri	ption of work order update	1	nitial	Action		Sign &		
Cause		Date	Step	Qty		or Non-conformance	Ch	ief Eng	Description		Date	Verification	QC Inspector
Doc/Data													
Equip/Tooling													
Operator									,				
Material													
Setup						~							
Other	Г												
Process													
Supplier			1										
Training													
Unapproved													
						F.	AUL	T CATE	GORY				
Land	ing (Gear				General				_	_		_
		Bending				Bend	Ш	Grain		L	Ovalized		Pressure/Forced
		Centre No	ot Conce	ntric to	o/s	BOM/Route		Hardwa	ire	L	Over/Under	tolerance	Temperature/Cure
		Cracks				Broken/Damaged	Ш	Inspect	ion Incomplete	L	Part Incorred	ct	Weld
		Crushed/	Crimped.	•		Burrs		Instruct	tions Incomplete/Unclear		Part Lost/Mi	ssing	Wrong Stock Pulled
		Cuffs				Contamination		Mainte	enance		Part Moved		_
		Heat Trea	it			Countersink	П	Mislabe	eled		Positioned V	Vrong	

Misread

Out of Calibration

Out of Sequence

Outside Dimensions

Offset

Other

Power Loss/Surge

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Inspection Strip in Tube

Torque Waves in Extrusion

Cut Too Short

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Work Orde <i>July-13-12 12:3</i>	1	7326		*873	326*						Page :	5
Revision ID:	D212-664-1			Accept	*N900	040	100)* s	etup Sta	I VI	S1*	
Item Name: Start Date: Required Date: Reference:	Crosstube Fv 7/20/12 7/27/12	Start Qty: 1.00 Req'd Qty: 1.00	*1* *1*		Cust Item I Customer:	D:				i N	S2*	
Approvals:	Process Pl	an:	Date:	Tooling: SPC (Y/N):		ate:		R	Run Sta	P	R1* R2*	
Sequence ID/ Work Center II 200 **200* SprayPaint Spray Painting	D		de and outside crosstube ide crosstube as per DEC	Set Up/ Run Hours 0.00 0.00 as per QSI 005 4.2 D212-667-141 with Whit	Tool ID	Tool#	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp	

210

QC14- Inspect Spray Paint

0.00

<u>*</u>210*

Memo

Start Time:_ Finish Time:_

0.00

Quality Control

Then, Wrap in plastic bag to protect from scratches

											DQA:	Date:	
NCR:	Yes	/ No				WORK ORDER NON-O		VFOR	MANCE / UPE	DATE			
						·					QA Closed:	Date:	
Work Orde	~					DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
WOIK OIG	=1					Rework	1		Skid-tube	Crosstube	1	Water Jet	Engineering
Part I	No.					Scrap	1 1		Machining	Small Fab	Pro	d. Eng. Coor.	Quality
raici	' '. –				·-	Use-as-is	1		noforming	Finishing	4	re/Packaging	Other
NCR I	No.					Work Order Update	1		Large Fab	Composite	1	Supplier	1
	_		·				1		, <u></u>		-		·
Root					Descri	ption of work order update	1	nitial	Act	ion	Sign &		
Cause		Date	Step	Qty		or Non-conformance	Ch	ief Eng	Descr	iption	Date	Verification	QC Inspector
Doc/Data	Ш												
Equip/Tooling	Ш												
Operator	Ш												3,0
Material	Ш												
Setup	Щ						l						
Other	Ш										İ		
Process	Ш												
Supplier	Ш												
Training	Н												
Unapproved				<u> </u>	<u> </u>		1	TCATE	CORY		1	<u> </u>	1
1 41							AUL	T CATE	GURY				
Landi						General Bend		Grain			Ovalized		Pressure/Forced
	$\boldsymbol{\vdash}$	Bending Centre No	t Cancar	atric to		BOM/Route	\vdash	Hardwa	uro.	-	Over/Under	toloranco	Temperature/Cure
	\vdash	Cracks	n concer	ונוונ נט	∪,3 <u> </u>	Broken/Damaged	-	1	ire ion Incomplete	-	Part Incorre	 	Weld
	-	Crushed/0	Crimned		-	Burrs	\vdash	1	tions Incomplete/L	Inclear	Part Lost/M	<u> </u>	Wrong Stock Pulled
	\vdash	Cuffs	umpeu,		 	Contamination		Mainte	•	Jiicleal	Part Moved		
		Julis Heat Trea	t		-	Countersink	\vdash	Mislahe			Positioned \		

Misread

Out of Calibration

Out of Sequence

Outside Dimensions

Offset

Power Loss/Surge

Other

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Inspection Strip in Tube

Torque Waves in Extrusion

Cut Too Short

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Work Ord uly-13-12 12:		7326		*873	326*						Page 6	5
tem ID: Revision ID:	D212-664-1	01F		Accept	*N900	040	100)* s	etup Star	171	S1*	-
tem Name:	Crosstube Fw	vd							Stop	' *N	S2*	
tart Date:	7/20/12	Start Qty: 1.00	*1*		Cust Item l	D:						
Required Date	: 7/27/12	Req'd Qty: 1.00	*1*		Customer:							
leference:							_	77	C4a.	.		
pprovals:	Process Pl	an:	Date:	Tooling:	D	ate:		K	un Star	1/	R1*	
	QC:		Date:	SPC (Y/N):	D	ate:			Stop	*N	R2*	
equence ID/ Vork Center I	D	Operation Description		Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp	
²⁰ * ク クハ*		Crosstubes										_
Crosstubes		Memo		0.00								
Crosstubes		1-Abrade m clean the ar	nating surfaces of support ea with 4105S wash 'n	and crosstube with 400 gri	t sandpaper,							
		2-Install sup A/R Pro		per OSI9563 and QSI 015								
		3- Torque b	oolts as per dwg									
30		QC6- Inspect dimension	ns to drawing	0.00								
230												_
QC Quality Control		Memo		0.00								
quanty Control					\ \	\wedge						
40		Pick Kit		0.00								
* 74 0*		Memo		0.00								

Packaging

											DQA	٠: D	ate:	
NCR:	Yes	/ No				WORK ORDER NON-O	100	NFORM	MANCE / UP	DATE				
											QA Closed	l: C)ate:	
Work Orde	or.					DISPOSITION				AGAINST DE	PARTMEN	T/PROCESS		
Work Orde	- · ·	·	···			Rework]		Skid-tube	Crosstube	1	Water Je	et	Engineering
Part N	No.					Scrap			Machining	Small Fab	Pr	od. Eng. Coo	r. 🗔	Quality
	-					Use-as-is]	Thern	noforming	Finishing	Rec/St	ore/Packagin	g	Other
NCR N	NCR No. De					Work Order Update			Large Fab	Composite		Supplie	er	
			T	1	D		1	luniai a l	Δ.	*:	Cian 0			<u> </u>
l		Data	Cton	0+1		ption of work order update or Non-conformance	1	Initial		tion ription	Sign & Date	Verificati	ion	QC Inspector
Cause		Date	Step	Qty	•	or Non-comormance	10	nief Eng	Desc	приоп	Date	Verificati	-	QC IIISPECTOI
Doc/Data	\sqcup		ľ											
Equip/Tooling	Ш													
Operator	Ш										1			
Material														
Setup	П											ĺ		
Other												İ		
Process	П													
Supplier	П						1							
Training				}										
Unapproved	П													
						F	AUI	LT CATE	GORY					
Landi	ing G	ear				General								
		Bending				Bend		Grain			Ovalized			Pressure/Forced
	П	Centre No	ot Concei	ntric to	o/s	BOM/Route		Hardwa	re		Over/Und	er tolerance		Temperature/Cure

Inspection Incomplete

Maintenance

Out of Calibration

Out of Sequence

Outside Dimensions

Mislabeled

Misread

Offset

Instructions Incomplete/Unclear

Weld

Other

Wrong Stock Pulled

Part Incorrect

Part Moved

Part Lost/Missing

Positioned Wrong

Power Loss/Surge

Broken/Damaged

Contamination

Countersink

Cut Too Short Drill Holes

Drawing

Finish

Folio

Burrs

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Cracks

Cuffs

Heat Treat

Crushed/Crimped

Inspection Strip in Tube

Torque Waves in Extrusion

Work Orde <i>July-13-12 12:3</i>		326		*873	326*						Page 7
Revision ID:	D212-664-10			Accept	*N900	040	100)* s	etup Stai	I VI .	S1*
	7/20/12 7/27/12	Start Qty: 1.00 Req'd Qty: 1.00	*1* *1*		Cust Item I Customer:	D:				IV.	S2*
Approvals:	Process Pla	ın:	Date:	Tooling:	Da	ate:		R	tun Sta	!/	R1*
	QC:		Date:	SPC (Y/N):	Da	ate:			Sto	*N	R2*
Sequence ID/ Work Center II)	Operation Description QC4- 100% Inspect kits	for completeness	Set Up/ Run Hours	Tool ID	Tool#	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250 QC Quality Control		Memo		0.00							·
260 *260* Packaging		Packaging Memo		0.00							
Packaging		Identify and	I pack for shipping as per	PPP D212-664 101							

0.00

0.00

270

Quality Control

QC21- Final Inspection - Work Order Release

Memo

W 12.07.20

MUJ 12/07/20

											DQA:	Date:		
NCR:	Yes	/ No				WORK ORDER NON-	COI	NFORM	MANCE / UP	DATE				
		*									QA Closed:	Date:		
Mort Ord						DISPOSITION				AGAINST DE	PARTMENT	/PROCESS		
Work Ord	er:				•	Rework	٦		Skid-tube	Crosstube	1	Water Jet	Engineering	
Part	Nο					Scrap	-		Machining	Small Fab	Pro	d. Eng. Coor.	Quality	
	10.					Use-as-is	7		noforming	Finishing		re/Packaging	Other	
NCR	No.					Work Order Update	1	•	Large Fab	Composite	1	Supplier		
						· <u> </u>			• Ц	· L				
Root					Descri	ption of work order update		Initial	Ac	ction	Sign &			
Cause		Date	Step	Qty	(or Non-conformance	Ct	nief Eng	Desc	ription	Date	Verification	QC Inspector	
Doc/Data														
Equip/Tooling														
Operator														
Material														
Setup					Ì									
Other			•									İ		
Process														
Supplier														
Training														
Unapproved														
							FAUI	LT CATE	GORY					
Land	ing (1				General		_		,——	7	_	7	
		Bending				Bend		Grain		<u> </u>	Ovalized	ļ	Pressure/Forced	
	L	Centre Not Concentric to O/S BOM/Route						Hardwa	re		Over/Under	tolerance	Temperature/Cure	
	Cracks Broken/Damaged						Inspecti	ion Incomplete		Part Incorre		Weld		
	Crushed/Crimped. Burrs						Instructions Incomplete/Unclear				issing	Wrong Stock Pulled		
	Cuffs Contamination Contamination					Maintenance			Part Moved					
		Heat Trea	at			Countersink	Mislabeled				Positioned Wrong			
1		Inspection Strip in Tube Cut Too Short					1	Misread	Ł		Power Loss,	/Surge	Other	

Offset

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Ripples in Bend

Torque Waves in Extrusion

Drill Holes

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

July-13-12 12:36:52 PM

Work Order ID:

87326

Parent Item:

D212-664-101F

Parent Item Name:

Crosstube Fwd

Start Date: 7/20/12

Required Date: 7/27/12

Start Qty: 1.00

Required Qty: 1.00

Comments:

IPP Rev:E04.02.16ReformatKJ/DS

IPP Rev:F 06-03-29

Remove Coments on Pick List JLM JLM

IPP Rev:G 07-04-30 As per Rev C strip ecn 11-5-49 EC verified by:DD

IPP Rev:H 11.04.26 inspection

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-101-TRN Crosstube Turning Detail		Manufactured	No	· Att.		110	Each	4.0000	. 1	1			
D212-lde	4-101			Location FG046 6858 8582 8582 8583 LG	27 28 30	Loc Oty 2 0 1 1 2		oc Code	B	87 2 	28 Ll	(X
D3595-063-450 RUBBER CUSHION		Manufactured	No	8582	29	230	Each	105.0895	4	4.210526	3		
				LG 825 LG051	11	9.28 9.28 9.5.7		oc Code					
				8010 847 MAT052 673: 688: 701 713: 741 755:	53 93 13 54	1.7 84 10.109474 2 6 0.56 0.2 0.349474						wir.	

NCR:	Yes	/ No				WORK ORDER NON-O	COI	VFORM	MANCE / UPI	DATE				•	
												QA Closed:	Da	te:	
Work Ord	er.					DISPOSITION				AGAINST D)EF	PARTMENT	PROCESS		
Part No					Rework Scrap Use-as-is Work Order Update		Skid-tube Crosstube Machining Small Fab Thermoforming Finishing Large Fab Composite			Water . Prod. Eng. Co Rec/Store/Packagi Suppl				Engineering Quality Other	
Root						ption of work order update	1	Initial		tion		Sign &			
Cause		Date	Step	Qty	(or Non-conformance	Ch	ief Eng	Desci	ription	\dashv	Date	Verification	n	QC Inspector
Doc/Data Equip/Tooling Operator Material Setup Other Process Supplier Training Unapproved			-					,							
							AUI	T CATE	GORY						
Landi		iear Bending Centre No Cracks Crushed/			0/s	General Bend BOM/Route Broken/Damaged Burrs		4 '	re ion Incomplete ions Incomplete/	Unclear		Ovalized Over/Under Part Incorre Part Lost/M	ct		Pressure/Forced Temperature/Cure Weld Wrong Stock Pulled
	Cuffs Heat Treat Inspection Strip in Tube Contamination Countersink Cut Too Short					Mainte Mislabe Misread	eled	-		Part Moved Positioned \ Power Loss/	Vrong		Other		
				Drill Holes		Offset		L		1	1 0 #		. <u>. </u>		

Out of Calibration

Out of Sequence

Outside Dimensions

DQA:

Date:

Turning Sequence

Wave/Twist in Tube

Torque Waves in Extrusion

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

July-13-12 12:36:52 PM

Work Order ID:	87326									
Parent Item:	D212-664-101F						Start 1	Date: 7/20/12		Required Date: 7/27/12
Parent Item Name:	Crosstube Fwd						Start	Qty: 1.00		Required Qty: 1.00
MS21920-25		Purchased	No		220	Each	136.0000	4	4	
Clamp(per MIL-DTL-87	783C)									
				Location	Loc Oty		Loc Code			
				LG050	117					
				116264	2					
				117998	4					
				118142	4					
				119339	2					
				119746	2					ï
				120475	7					
•				120920	46					
				122204	50					
				LG051	19					
				121583	19					
D2893-1		Manufactured	No		220	Each	16.0000	2	2	
2.75 Support								(a	·	The second secon
				Location	Loc Qty		Loc Code			
				LG	9					
				83056	9					
				LG052	7					
				72865	2					
				80271	4					
				82228	1					
D3428-1		Manufactured	No		240	Each	33.0000	1	1	
Placard		Manufactureu								
Tacaru					I 0		I C. J.			
				Location	Loc Oty		Loc Code			
				ST042	33					4*
				78933	2					•
				81881	9					
				83582	10					
				85228	12					

											DQA:	Date	:
NCR:	Yes	/ No				WORK ORDER NON-	COI	NFORM	ANCE / UP	DATE		_	
											QA Closed:	Date	::
Mork Ord	or:					DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
	Vork Order:Part No.					Rework Scrap	Skid-tube Crosstube Machining Small Fab			Pro	Water Jet d. Eng. Coor.	Engineering Quality	
NCR	•					Use-as-is Work Order Update	Thermoforming Finishing Large Fab Composite			-{	re/Packaging Supplier	Other	
Root					Descri	ption of work order update		Initial	Ac	tion	Sign &		
Cause		Date	Step	Qty	(or Non-conformance	Cr	nief Eng	Desc	ription	Date	Verification	QC Inspector
Doc/Data													
Equip/Tooling													
Operator													
Material			į										
Setup													
Other									:				
Process													
Supplier													
Training													
Unapproved													
						F	AUI	LT CATE	GORY				
Land	ing (Gear				General					_		
İ		Bending				Bend		Grain			Ovalized		Pressure/Forced
		Centre N	Centre Not Concentric to O/S BOM/Route					Hardwa	re		Over/Under	tolerance	Temperature/Cure
		Cracks Broken/Damaged				Broken/Damaged		Inspecti	on Incomplete		Part Incorre	ct	Weld
	П	Crushed/Crimped. Burrs				Burrs	Г	Instruct	ions Incomplete/	Unclear	Part Lost/M	issing	Wrong Stock Pulled
	Cuffs Contamination						Mainte	enance		Part Moved	_	_	
		Heat Trea	at			Countersink		Mislabe	led		Positioned \	N rong	
		Inspectio	n Strip in	Tube		Cut Too Short		Misread	1		Power Loss,	/Surge	Other
	Inspection Strip in Tube Ripples in Bend					Drill Holes		Offset			-	_	

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Torque Waves in Extrusion

Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

Picklist Print

July-13-12 12:36:53 PM

Page 3

Work Order ID:	87326									
Parent Item:	D212-664-101F						Start I	Date: 7/20/12	R	equired Date: 7/27/12
Parent Item Name:	Crosstube Fwd						Start	Qty: 1.00	I	Required Qty: 1.00
AN6-35A BOLT		Purchased	No		240	Each	42.0000	4	4	
			Loca	<u>ition</u>	Loc Oty		Loc Code			
			342		42					
				121181	42					
N6-36A		Purchased	No		240	Each	47.0000	4	4	
olt										
			Loca	<u>ıtion</u>	Loc Qty		Loc Code			
			ST34	12	47					•
				118422	2					
				119449	1					
				120187	4					
				120423	40			4-1-1-1-1		
IS21042L6		Purchased	No		240	Each	479.0000	6	6	
ut										
			Loca	<u>ition</u>	Loc Qty		Loc Code			
			ST3	00	479					
				117677	25					
				118384	3					
				118927	48					
				119075 120308	203 200					
NO 60 FD 64 6	NAG1140D0//21		NI-	120308		Each	0.0000	18	10	
N960JD616 Vasher	NAS1149D0663J	Purchased	No		240	Each	0.0000	10	18	

											DQA:	Date	:
NCR:	Yes	/ No				WORK ORDER NON-	COI	NFORN	ANCE / UPD	ATE			
											QA Closed:	Date	:
Work Orde	or:					DISPOSITION				AGAINST DE	PARTMENT	/PROCESS	
Work Orde	۲۱.					Rework		Skid-tube	Crosstube]	Water Jet	Engineering	
Part f	Vo.					Scrap	1		Machining	Small Fab	Pro	d. Eng. Coor.	Quality
	•					Use-as-is	1		noforming	Finishing	4	re/Packaging	Other
NCR I	No.					Work Order Update			Large Fab	Composite]	Supplier	
Root					Descri	ption of work order update	T	Initial	Acti	on	Sign &		
Cause		Date	Step	Qty	(or Non-conformance	Ch	nief Eng	Descri	ption	Date	Verification	QC Inspector
Doc/Data							1						
Equip/Tooling													
Operator	Ш												
Material	Ш												
Setup													
Other			į										
Process			i i				İ						
Supplier													
Training													
Unapproved			1	<u> </u>									<u> </u>
							FAUI	LT CATE	GORY				
Landi	ng (Gear			_	General	_	-			7		_
		Bending				Bend	L	Grain			Ovalized	_	Pressure/Forced
		Centre Not Concentric to O/S BOM/Route				BOM/Route	L	Hardwa	re		Over/Under	tolerance	Temperature/Cure
	Cracks Broken/Damaged			Broken/Damaged		Inspecti	on Incomplete		Part Incorre	ct	Weld		
	Crushed/Crimped Burrs				Burrs		Instruct	ions Incomplete/U	Inclear	Part Lost/M	issing	Wrong Stock Pulled	
		Cuffs				Contamination	L	Mainte	nance		Part Moved		
		Heat Trea	at			Countersink		Mislabe	led		Positioned \	Wrong	
		Inspectio	n Strip in	Tube		Cut Too Short		Misreac	I		Power Loss,	'Surge	Other
	Ripples in Bend					Drill Holes		Offset		_	_	_	

Out of Calibration

Out of Sequence

Outside Dimensions

Turning Sequence

Wave/Twist in Tube

Torque Waves in Extrusion

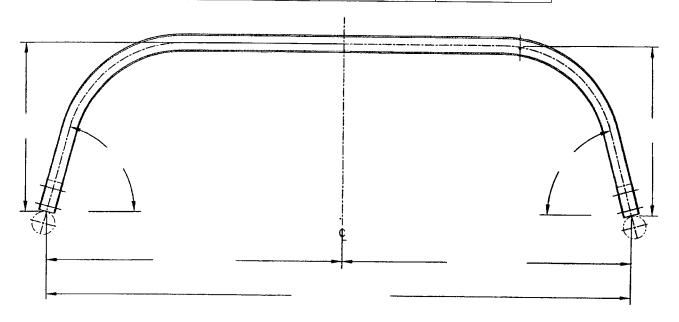
Drawing

Finish

H:/FORMS/Quality Assurance\approved QA/NCRWO Rev G

DART AEROSPACE LTD	Work Order:	87326
Description: Crosstube High Fwd (205/212/412)	Part Number:	D212-664-101
Inspection Dwg: D212-664-141 Rev: D		Page 1 of 1

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7
Bending Passes	3	**
Crushing		6%



	Side A	Side B
Bending Passes		
Crushing		
	Comments	

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
Α	07.02.06	New Issue	KJ/JM	
В	03.04.21	Dwg Rev updated	KJ/JM	
С	10.04.01	Dwg Rev updated	KJ 0	
D	12.04.16	Added bending, crushing dimensions	KJ 🖎	W

Item	Qty -141	Qty -141B	Part Number	Description
1	х		D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
2		X	D212-664-141B	CROSSTUBE ASSEMBLY (214 HIGH FWD)
3	1	1	D6005-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	. 4	4	MS21920-25	CLAMP (OR MS21920-26)
7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

D

В

1) MATERIAL: MANUFACTURED FROM D6005-128

FINISHED LENGTH = 126.514±0.020

CHEMICAL CONVERSION COAT PER DART QSI 005 4.1 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2 PAINT OUTSIDE PER DART QSI 005 4.2

3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED

4) UNITS: INCHES UNLESS OTHERWISE NOTED.

5) BREAK SHARP EDGES: 0 005 TO 0.010 MAX

IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS

WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664) D212-664-141B = 33.6 lbs (PER IIN-D212-664)

8) PART IS SYMMETRIC ABOUT CENTERLINE.

9) RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALY, TRANSITION SHOULD BE SMOOTH.

10) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS

11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.

12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0 06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.

13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063 450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT

14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY RETURN TO **ENGINEERING** UNCONTROLLED COPY SUBJECT TO AMENDMENT WITHOUT NOTICE

WORK ORDER MLJ

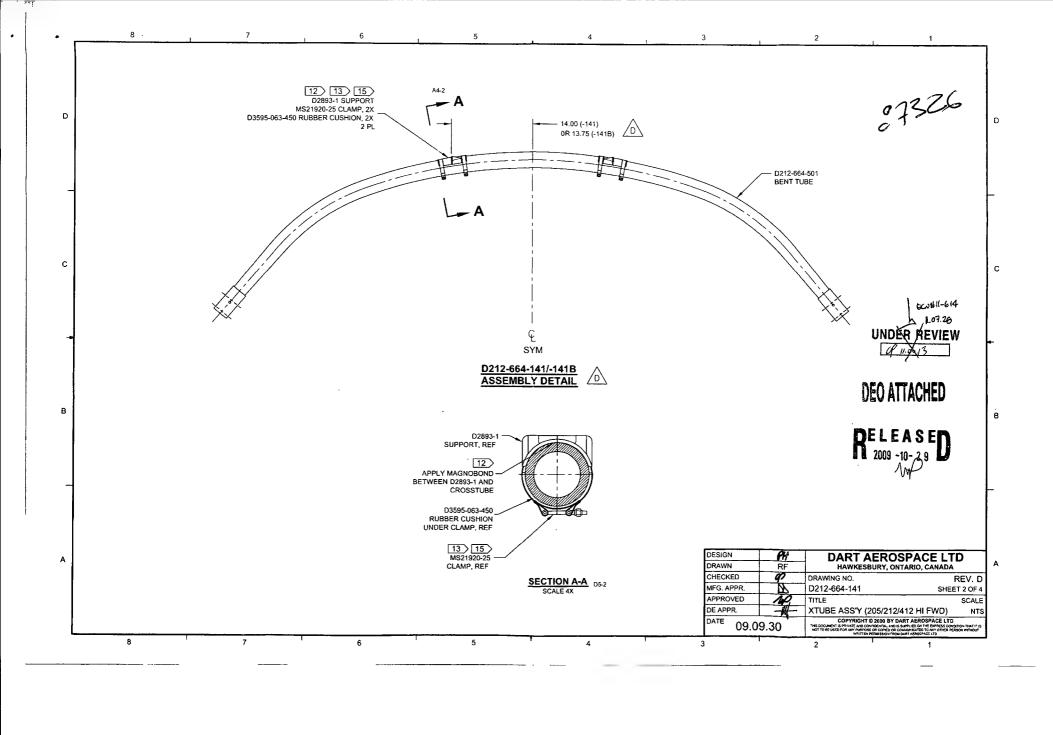
12/07/16

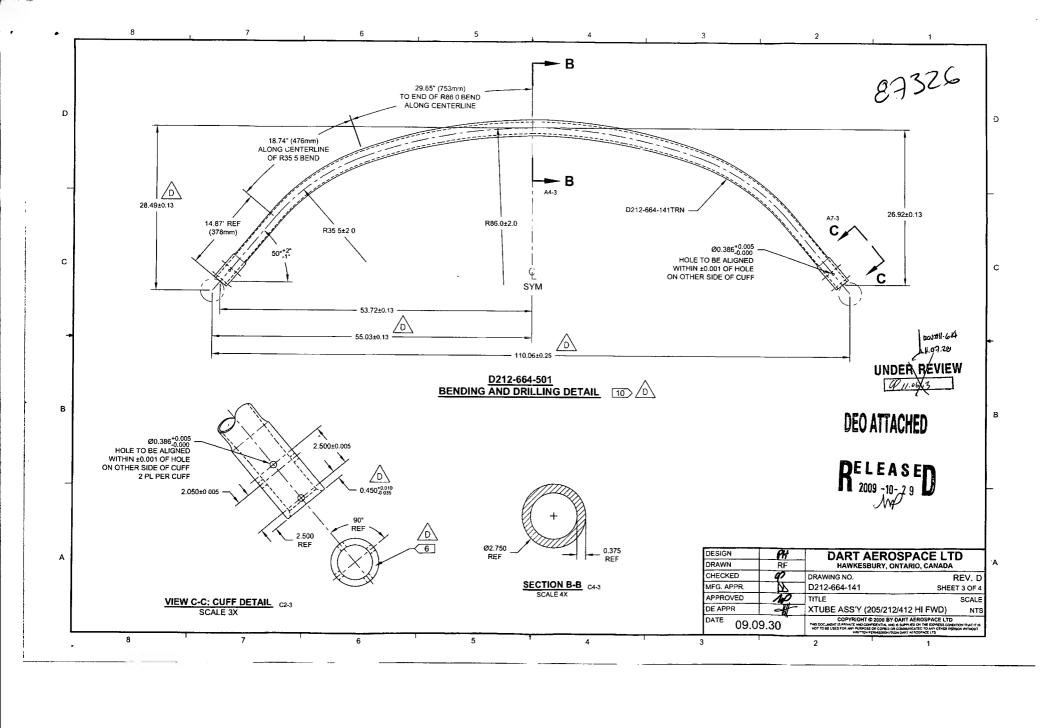
REMOVED FROM WIDER REVIEW PER UNDER BEVIEW SCN #11-G14

DEO ATTACHED

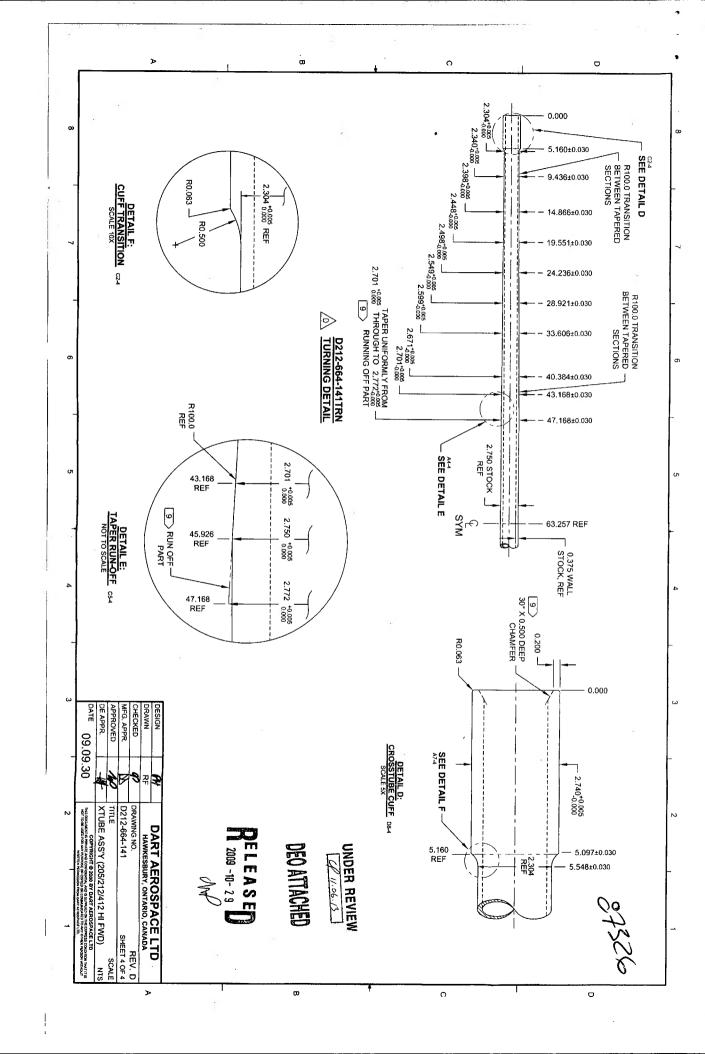
В

D	REFORMATIREVISE GENERAL NOTES/PART LIST; RECORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2); REMOVED REF & ADD TOLERANCES (ZN B4-3, C6-3, C8-3 8 B6-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4						
С			SION STRIP; ADD MAGNOBOND ÆRSE CLAMPS	PH	07.03.08		
В.	ADD HOLES FOR COMPATABILITY WITH BHT/AA PH 05.02.04						
Α	NEW IS	SSUE		PH	00.12.12		
REV			DESCRIPTION	BY	DATE		
DESIGN PH			DART AEROSPACE LTD				
DRAWN		RF	HAWKESBURY, ONTARI				
CHECKED 97		q)	DRAWING NO		REV. D		
MFG. APPR.		187	D212-664-141 SHEET 1 O				
APPROVED 10		10	TITLE SC/				
DE APPR			XTUBE ASS'Y (205/212/412 HI FWD) NTS				
DATE 09.09.30			COPYRIGHT © 2000 BY DART AEROSPACE LTD THE DOCUMENT IS PRIVATE AND COMPRETATION, AND IS SUPPLIED ON THE EXPRESS CONCIDENT THAT IT IS NOT TO SEE USED FOR ANY PROPOSE OR CONCEPT OR COMMUNICATE TO SAM OTHER PRESON WITHOUT				





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DRAWING NO.	TITLE	÷	REV. D	DART AE	ROSPACE LTD	D.E.O. NO.		SHEET NO.	SCALE
D212-664-141	XTUBE ASS	Y (205/212/412 HI	FWD)	ENGINE	ERING ORDER	D212-664	4-141 <u>-</u> D-1	SHEET 1 OF	2 NTS
DRAWN	4	CHECKED (R	MFG. APPR.	E	APPROVED	NA,	DE APPR.	_
DATE 11.04	.07	DATE)	1, 6, 1)	DATÉ	11.04.12	DATE	11/04/12	DATE 11.0	4.12

ADD AN INSPECTION WINDOW TO UNDERSIDE OF CROSSTUBE.

CHANGE:

NOTES 2 OF SHEET 1 IS AMENDED AS FOLLOWS:

IS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2

MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND

PAINT OUTSIDE PER DART QSI 005 4.2

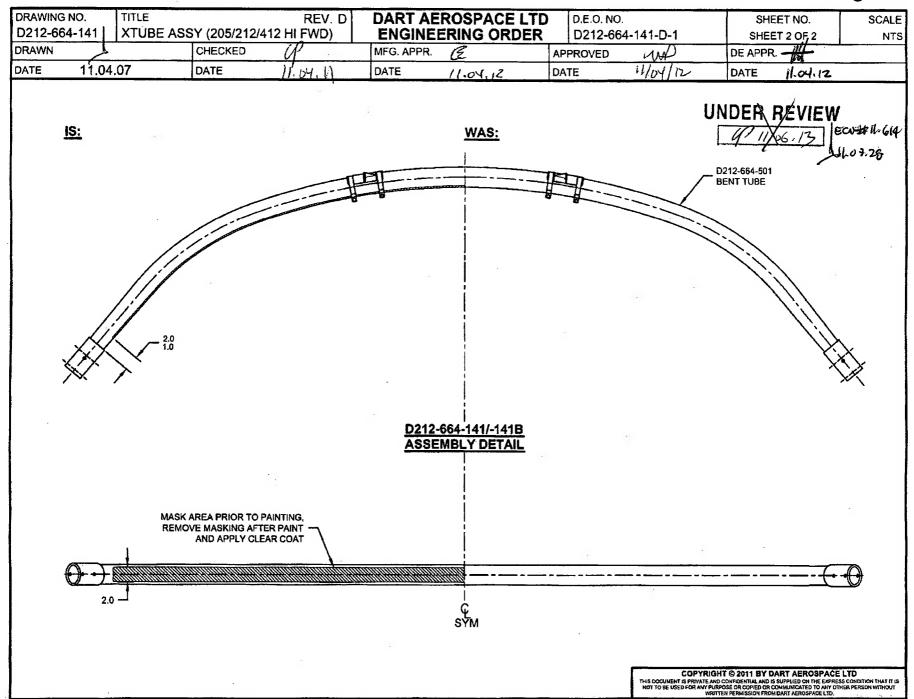
REMOVE MASKING AND APPLY CLEAR COAT

WAS:

2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1

PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2

PAINT OUTSIDE PER DART QSI 005 4.2



DRAWING NO.	TITLE REV. D	DART AEROSPACE LTD	D.E.O. NO.	SHEET NO.	SCALE
D212-664-141	CROSSTUBE ASS'Y (205 HI FWD)	ENGINEERING ORDER	D212-664-141-D-2	SHEET 1 OF 1	NTS
DRAWN //	CHECKED A>S	MFG. APPR	APPROVED AND	DE APPR.	
DATE 11.07	15 DATE 11.07.20	DATE 11.07.21	DATE 11/07/21	DATE 11.07.21	

PURPOSE:

REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

ltem	Qty -141	Qty -141B	Part Number	Description
7	A/R	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

7	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023
				ADHESIVE (TEXTRON/BELL SPEC. 299-947-100,
				TYPE II, CLASS 2 ADHESIVE)

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS

- 12) TO INSTALL D2893-1 SUPPORT: ABRADE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

WAS:

- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.



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